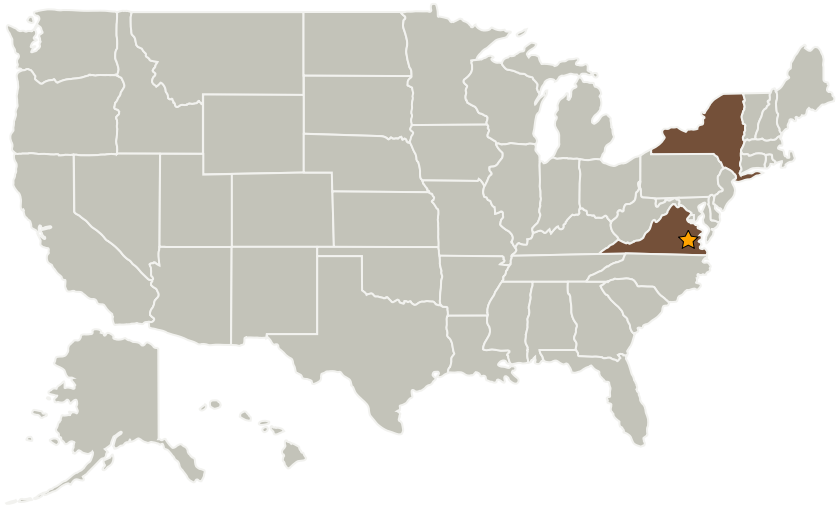
Real-Time Fault Contingency Management for Integrated Vehicle Health Management, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

Impact Technologies, with support from the Georgia Institute of Technology and Honeywell, propose to develop and demonstrate a suite of real-time Fault Contingency Management (FCM) algorithms for application within an Integrated Vehicle Health Management (IVHM) system. The proposed FCM software will implement a novel vehicle subsystem fault accommodation approach based on a seamless integration between real-time system health identification and adaptive controller techniques. Specifically, the continuous health assessment algorithms include a real-time adaptive recursive system identification algorithm and an enhanced real-time moving horizon estimation (MHE) algorithm that will be developed and implemented on a prototype embedded system. The proposed FCM software hierarchy will act from the subsystems level up through the vehicle level and will implement fault-accommodating control, health management, and contingency management to accomplish its goal. The significant technology advancement proposed herein is based on the use of dynamic simulation models in a real-time computing environment to not only update health status predictions, but also to determine "on the fly" how accommodate for them. At the conclusion of Phase I, the project team will deliver a proof-of-concept demonstration of the proposed techniques running on an embedded platform using high fidelity propulsion and aircraft simulation models.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Impact Technologies, LLC	Supporting Organization	Industry	Rochester, New York

Primary U.S. Work Locations	
New York	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.2 Reasoning and Acting
    - TX10.2.5 Fault Diagnosis and Prognosis